

Abstract of the Disclosure

A method and an apparatus for optical modulators based on dark resonance in which three laser lights interact with at least a three-level nonlinear optical medium composing two closely spaced ground states and an excited state through nondegenerate four-wave mixing. The modulation mechanism is based on the dark resonance induced two-photon coherence between the two closely spaced ground states through optical transitions via an excited state. The two-photon coherence induced on the ground states is optically detected via nondegenerate four-wave mixing. The nondegenerate four-wave mixing generation is enhanced owing to the dark resonance or electromagnetically induced transparency. The modulation time based on the present optical modulation method is not limited by population relaxation time or carrier's lifetime. More advantage is given by signal amplification and line narrowing owing to the dark resonance enhanced nondegenerate four-wave mixing.